Remarks

Claims 1, 9, and 18 have been amended, and claim 5 canceled. Claims 1-4 and 6-18 remain pending in the application. Reexamination and reconsideration of the claims, in view of the discussion below, are respectfully requested.

The examiner objected to the drawing for including the reference numeral "2" in Fig. 1, but not being referenced in the specification. The specification has been amended to include a reference to item 2 in Fig. 1.

The examiner objected to claims 9 and 18 for informalities. These claims have been amended to cure the informalities.

Claim 1 was rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps. Applicants have responded by inserting the language of former claim 5 into claim 1. Applicants submit that claim 1, as amended, properly sets forth a method of the invention.

Claims 1-7, 10-12 and 14-18 were rejected under 35 U.S.C. 103(a) as being unpatentable over Takahashi et al. (Patent no. 5,105,151).

Takahashi et al. discloses a method of detecting carburized portions within, for example, cracking tubes. In the disclosed method, a first magnet is placed with its poles parallel to the surface of the pipe, and a second magnet is placed with its poles perpendicular to the pipe surface. Hall elements are used to detect the magnetic flux of each magnet. While the reading from the first magnet will be affected by both carburized portions within the pipe and any depletion zone at the surface of the pipe, the second magnet will only detect changes in the surface of the pipe, i.e. within the depletion zone. Takahashi et al.discloses subtracting the reading of the second magnet from that of the first, such that a final reading can be obtained that relates only to the carburized portions within the pipe (near its inner surface). The readings resulting from the deteriorated layer at the surface of the pipe are removed from the output.

Therefore, although Takahashi et al. does disclose obtaining magnetic flux readings that relate to the subsurface chromium depletion zone of a steel member, this is measured purely so that these changes in magnetic flux can be discarded from the final analysis of the pipe. Consequently, the Takahashi et al. reference does not realize the important benefits that can be obtained by monitoring the thickness of the chromium depletion layer, but it rather sees this layer as an inconvenient source of error during carburization measurements.

There is, therefore, a clear difference in intent between Takahashi et al. and the present invention. In the present invention, the inventors have realized that monitoring the thickness of the chromium depletion layer in the subsurface of the pipe provides a valuable indication of the pipe integrity by providing information on the surface oxide layer of the steel member.

Consequently, unlike Takahashi et al., in the method of the present invention the measurements relating to the subsurface chromium depletion of the pipe are not simply subtracted from the overall measurement as an error, but instead are used to provide an estimate of the thickness of the chromium depleted zone.

Claim 1 has been amended to include this feature of providing an estimate or determining the thickness of the chromium depleted zone. Since all of the other claims depend directly or indirectly from claim 1, Applicants submit that the claims are both novel and non-obvious over Takahashi et al.

Applicants appreciate the examiner's indication that claims 8, 9 and 13 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. However, based on the discussion above, Applicants believe the suggestion is unnecessary.

In view of the present amendments to the claims and the remarks herein, Applicants respectfully submit that claims 1-4 and 6-18 are allowable, and Applicants request that the examiner pass these claims to issuance at an early date.

No fees are believed due. If, however, the Commissioner believes any additional fees are due, the Commissioner is hereby authorized to charge any such fee deficiency, or credit any fee overpayment, to Deposit Account No. 14-0629.

Respectfully submitted,

NEEDLE & ROSENBERG, P.C.

Sumner C. Rosenberg
Reg. No. 28,753

NEEDLE & ROSENBERG, P.C.
Customer Number 23859
(678) 420-9300
(678) 420-9301 (fax)

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Sumner C. Rosenberg — Date: 5/17/07